



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re the Application of:

Kimmo LAIHO

Serial No.: 10/087,437

Filed: March 2, 2002

For: System and Method for Broadband  
Digital Broadcasting

Atty. Docket No.: 004770.00033

Group Art Unit: 2684

Examiner: Gantt, Alan T.

Confirmation No.: 3461

**DECLARATION UNDER 37 C.F.R. § 1.131**

The Honorable Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

We, Kimmo Laiho, Harri Pekonen, and Juha Tomberg, hereby declare that:

- 1) We are the joint inventors of the above-captioned application;
- 2) Prior to December 14, 2001, the filing date of U.S. Pat. Appl. Publ. No. 2003/0112821 A1 (hereinafter "Cleveland"), we conceived of the invention recited in claims 19, 20, 22-25, 27, 28, 31, 34, 36-38, 40 and 46 of the above-captioned application, and diligently pursued constructive reduction to practice in the form of a patent application filed with the United States Patent & Trademark Office.
- 3) Prior to December 14, 2001, we prepared and submitted an invention report evidencing conception to the Nokia Internal Patent Committee for *Time Slicing Method on DVB-T Mobile Network*, a copy of which is attached as Exhibit A. The dates redacted from the invention report in Exhibit A are prior to December 14, 2001. Other redactions pertain to information irrelevant to establishing a prior date of invention.

- 4) On December 11, 2001, we sent Brad Wright, our patent attorney at Banner & Witcoff, a fax containing revised drawings for the draft patent application. Evidence of our fax and Mr. Wright's receipt of the revised drawings is shown in the email attached as Exhibit B.
- 5) After taking into account the suggested revisions, Mr. Wright sent a second draft of the above-captioned patent application to my employer for my review on December 21, 2001. We provided further comments to this draft on January 4, 2002. A copy of the email string communicating the revised draft as well as the comments is attached as Exhibit C.
- 6) On February 5, 2002, Mr. Wright sent a revised second draft application to our employer for our review. Subsequently, we provided our comments and suggestions to the draft in an email on February 14, 2002. A copy of the emails communicating the draft and the comments is in the email string attached as Exhibit D. The redacted portion of Exhibit D is an email not referred to in this Declaration.
- 7) On February 19, 2002, Mr. Wright sent a revised draft of the above-captioned patent application, including the suggested revisions, to my employer for my review. A copy of the email communicating the revised draft is attached as Exhibit E.
- 8) Our employer sent subsequent revisions on our behalf to Mr. Wright on February 26, 2002, as evidenced by the email communication attached as Exhibit F.

- 9) On February 26, 2002, Mr. Wright sent a final draft of the above-captioned patent application to our employer for our review. A copy of the email communicating the final draft is attached as Exhibit G.
- 10) We reviewed the final draft application and then signed and returned a Joint Declaration for Patent Application on February 28, 2002.
- 11) On March 2, 2002, the above-captioned patent application was filed in the U.S. Patent and Trademark Office.
- 12) The submission of our invention reports to the Nokia Internal Patent Committee and exchange of draft applications with my patent attorney demonstrates conception of the invention prior to December 14, 2001, and diligence from a date prior to December 14, 2001, until the filing and constructive reduction to practice of the above-captioned patent application.
- 13) All acts referred to in this Declaration were performed either in the United States, or in a WTO member country.
- 14) Except for the above-mentioned redactions, the attached Exhibits have not been altered since they were originally submitted to the Nokia Internal Patent Committee or otherwise prepared or communicated.
- 15) We declare under penalty of perjury under the law of the United States of America that statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section

1001 of Title 18 of the United States Code and that such willful false statements  
may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

Kimmo Laiho  
Kimmo Laiho

Harri Pekonen  
Harri Pekonen

Juha Tomberg  
Juha Tomberg

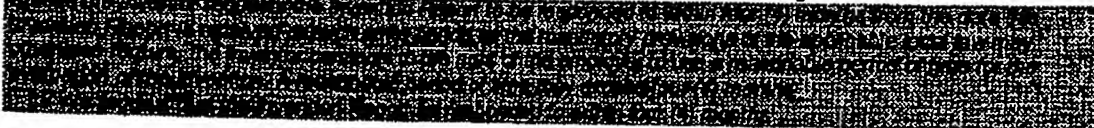
17.10.2005  
Date

6.10.2005  
Date

6.10.2005  
Date

**NOKIA**

**INVENTION REPORT**

Title of Invention: <b>Time Slicing Method (Client side) on DVB-T Mobile Network</b>		<b>INVENTION REPORT RECEIVED</b>	
<b>THE DESCRIPTION OF THE INVENTION MUST BE ATTACHED</b>			
Inventor's name, employee number, title and nationality: *) <b>Kimmo Laiho, 10021234, Senior R&amp;D Engineer, Finnish</b>	Home Address: *) <b>Ojarinne 24, 20810 Turku, Finland</b>	Business Unit and cost centre: <b>Nokia Ventures Organization 1046972</b>	
<b>Harri Pekonen, 10031936, Senior R&amp;D Engineer, Finnish</b>	<b>Upelintontie 64, 21260 Raisio, Finland</b>	<b>Nokia Ventures Organization 1046972</b>	
<b>Juha Tomberg, 10032700, Senior R&amp;D Engineer, Finnish</b>	<b>Honkatie 27, 20540 Turku, Finland</b>	<b>Nokia Ventures Organization 1046972</b>	
Line Manager(s): <b>Jarmo Kuusisto</b>			
Project: *) <b>Gallipoli, 100630967</b>		Project Manager: <b>Stuart Ravenscroft</b>	
Office address: *) <b>Joukahaisenkatu 1, FIN-20520 Turku</b>			
Phone: *) <b>+358 7180 33253</b>		Fax: *) <b>+358 7180 33222</b>	
The Invention becomes public on: <b>xxxxxxxx</b>			
<i>I am/ We are the sole/ and original inventor(s) of this invention.</i>			
<i>The company may, by virtue of applicable legislation, be entitled to full or partial rights to the invention.</i>			
<i>I/ We acknowledge my/ our obligation to sign as inventor(s) all documents that may be required for protecting the invention in different countries.</i>			
<i>Applicable to inventions made by inventors employed in FI, DK, DE and SE only.</i>			
			
Date: Signature(s) of Inventor(s):			

\*) See the instructions

<i>I have read and understood the invention described in this Invention Report</i>	
Date: Signature of Manager	

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## **INSTRUCTIONS FOR COMPLETING THE INVENTION REPORT**

This Invention Report form is used in cases where an invention has been made by an employee of the Company. This Invention Report is confidential. Only the Patent Department may make copies of signed Invention Reports in order to request opinions or reply to the inventor(s).

The inventor completes the Invention Report and the description of the invention. The inventor does not fill in the 'Invention Report received' field. This field is filled in by the Patent Department. The Invention Report must have the names of all the inventors and their home addresses. If there is not enough space for all the names, addresses etc, please write them on a separate attachment. The first mentioned inventor is assumed to be the contact person in matters concerning the Invention Report. In the fields of office address, phone and fax, please fill in the contact person's information. Fill in the project field, if the invention is made in a project. The original Invention Report is signed by all inventors. Each page of the original Invention Report is signed by a Manager. In case it is difficult to obtain Manager's signature your Patent Department will take care of it.

It is suggested that the Invention Report and the description of the invention should be filled in as thoroughly as possible. If drawings or other kind of information cannot be attached to this form, they should be delivered separately.

The signed Invention Report is given directly to the local or business unit's Patent Department. Invention Report should also be sent by E-mail to the Patent Department. The Patent Engineer will inform the inventor of receiving the Invention Report. The Patent Engineer will obtain any expert opinions needed to properly evaluate the invention, will procure the Company's decision and inform the inventor accordingly.

*I have read and understood the invention described in this Invention Report*

Date:  
Signature of Manager

**DESCRIPTION OF THE INVENTION**

Please, describe your invention in the following order. You can enclose the drawings on a separate document.

**1. Field and background of the invention**

Invention was made in Gallipoli project when defining how Client (DVB-T Receiver) power consumption could be reduced with Time-Slicing method in the DVB-T Mobile Network. Time-Slicing method is basically TDM meaning that receiver can be shut down unless nothing is being received and activated when needed.

**2. A summary of the invention**

Invention describes a solution to the Client end how to be able to optimise the power ON time (to reduce client power consumption). This invention gives an idea how the timing between bursts can be defined or known by the receiver side. This invention report is actually part of the similar invention report on network.

**3. Describe the problem which the invention overcomes**

The main problem is, that power consumption of IPDC client device has to be reduced, and with current technology power consumption of DVB-T front end is too high.

**4. How was the problem solved earlier?**

So far no Time-Slicing or similar method has been used in DVB-T Network (neither DVB-T mobile services nor networks available).

**5. How does the invention improve earlier solutions? Advantages and disadvantages of the invention?**

No earlier solutions.

With this new solution the client will be able to shut down the DVB-T receiver unless requested services are being received. This will reduce the power consumption. This feature is particularly efficient in streaming services.

**6. Brief description of the drawings (Please enclose drawings and figures of the invention on a separate document)**

Picture 1. Block diagram of the Elastic Buffering

This picture gives an idea how the Client side Elastic Buffer can work with the FIFO flags. (Filling and emptying of the FIFO is described in the graph).

The Elastic buffer can also be understood as Burst Buffer. One such buffer is needed by service (also here on client side).

**7. A more detailed description of the invention (if known at the moment)**

The client should be able to shut down the DVB-T receiver unless requested services are being received. The idea is to use Time-Slicing (TDM), which means that on the network

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Date:  
Signature of Manager

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side all services are constructed in such form that the client can receive the services in big bursts (with as large transmission path capacity as possible) and shut down the receiver between the bursts.

The size of bursts can be different for different services and client can also handle the services without bursts, but then of course power consumption can't be reduced (in practise receiver has to be on all the time). For one service the burst size can be fixed or vary slowly, so that with burst size averaging (measuring of incoming burst sizes) the receiver can adapt to slow burst size variations.

Client handles the bursts with a programmable-size (or fixed-size) Elastic Buffer (a FIFO), which has programmable (or fixed) Almost Full and Almost Empty flags. No control info has to be (but can be) exchanged between Client and Network. The Client can adapt to the fixed burst size (amount of fixed size packets) and thus adjust the size of the Elastic Buffer and also to set the control flags. The Elastic Buffer of the network side has the same size.

When Client is feeding the service to user application, which consumes the content, the Elastic Buffer mechanism will indicate by an "Almost Empty" flag to the Client to turn the DVB-T receiver on again and to be prepared to receive the next burst. Client has to program "Almost Empty" flag so that it takes care of all delays (for example bit rate adaptation, receiver switch-on time, acquisition time etc.) needed to get the DVB-T receiver ready to receive the next bursts. The "Almost Full" flag will be used to shut down the DVB-T receiver.

This method does not require return path for client to communicate with network - all information related to this method can be transferred from network to client only if needed.

**8. Explain, how the invention is/can be implemented. Which would be the best mode of implementation?**

The Elastic Buffer can be an integrated or an external memory of the Client or DVB-T receiver.

The Elastic Buffer can be structured as FIFO, ring buffer, or dual buffer with separate input and output sections.

**9. Explain how we can recognise if a competitor is using the same product/feature?**

If the client can switch off the receiver every now and then when receiving streaming services, then it most probably uses this method.

**10. Is it planned to use the invention in a Nokia product? If so, when and in which product? Is the invention standard related?**

This idea could be used to implement the TimeSlicing/TDM method in future DVB-T mobile networks and clients.

**11. Abbreviations**

CPU	Central Processing Unit
DVB	Digital Video Broadcasting
FIFO	First In First Out (memory type)
TDM	Time Division Multiplexing

I have read and understood the invention described in this Invention Report

Date:  
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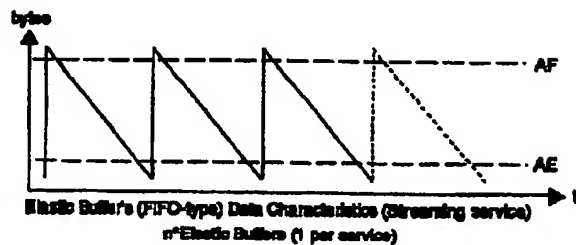
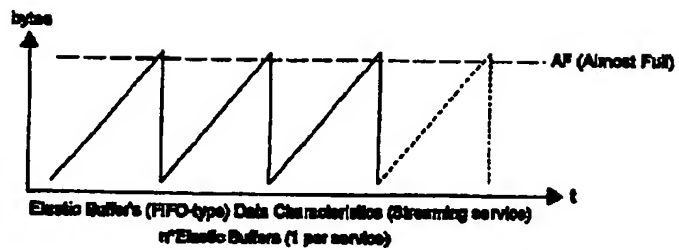
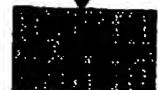
**12. Any further comments**



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Date:  
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Picture 1. Block diagram of the Elastic Buffering

I have read and understood the invention described in this invention Report

Date:  
Signature of Manager

**From:** Bradley Wright  
**To:** Stecewycz, Joseph  
**Date:** 12/11/01 9:10AM  
**Subject:** Fwd: Fax from '+' (6 pages)

Joe, I believe these revised drawings pertain to your case. Can you please revise the application as indicated and forward to Nokia with formal documents?

thanks, Brad

**CC:** Pease, Pamela Beth

**From:** Bradley Wright  
**To:** Stacewycz, Joseph  
**Date:** 1/30/02 8:28AM  
**Subject:** status of this application?

Joe, as you can see Ari is asking again about this application for which they sent us comments back on January 4th (more than 4 weeks ago). When will you have a final draft sent to Nokia (including formal documents)?

Brad

**From:** Aarnio Ari (NVO/Helsinki)  
**To:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**Cc:**

**Subject:** FW: Second Draft of NC28574 (our 004770.00033)  
**Sent:** 1/30/02 1:22 PM  
**Importance:** Normal  
Have you received?

Ari

-----Original Message-----

**From:** Aarnio Ari (NVO/Helsinki)  
**Sent:** 04 January, 2002 17:12  
**To:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**Subject:** RE: Second Draft of NC28574 (our 004770.00033)

Brad and Joe,

Please find enclosed our amendments written mainly into the document. I think the next draft would be quite close to final.

BR Ari

Some notes:

Please amend the claims and amend in the proper form. Further please add the additional material in claims also to the specification, if needed.

I send the figures through fax.

Please feel free to contact me if you have any questions. Especially if you need any further information regarding changes in claims 30, new claim 31, new claim 32 :

31. A system as in claim 30 wherein in the transmitter and receiver system at least one receiver buffer adapts to a predetermined transmitter buffer according to the desired service extracted from the information stream.

32. A system as in claim 30 wherein information service provider transmits at least one service in at least one information stream.

please let me to know.

elastic buffer = please check e.g. from <http://glossary.its.bldrdoc.gov/its-1037/dlr-013/1918.htm>

BR Ari

-----Original Message-----

**From:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**Sent:** 21 December, 2001 1:50

To: Aamio Ari (NVO/Helsinki)  
Subject: Second Draft of NC28574 (our 004770.00033)

Ari, attached is a second draft of the above-identified patent application. Please note that Joe Stecewycz has indicated that some of the comments were a bit unclear and may require further clarification. We look forward to receiving further comments on this draft prior to filing.

Best regards, Brad

74981\_3.doc

CC: Pease, Pamela Beth

From: Bradley Wright  
To: Stecawycz, Joseph  
Date: 2/14/02 9:39AM  
Subject: please figure this out asap

Joe, apparently there was some miscommunication on this one. See e-mail from Ari below. Can you please fix this as soon as possible? Thanks, Brad

From: Aarnio Ari (NVO/Helsinki)  
To: Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
Cc:

Subject: RE: Second Draft of Nokia NC28574,-5,-6/004770.00033  
Sent: 2/14/02 11:08 AM  
Importance: Normal  
Brad and Joe,

It seems that there has been a information gap between these different timeslicing cases and this one as the additional figures provided earlier in e.g. case 28601 have not been into consideration here in this case. They might have answered the questions.

However we have incorporated the answers to Joe's questions in the document. Hopefully that helps.

BR Ari

-----Original Message-----

From: Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
Sent: 05 February, 2002 16:37  
To: Aarnio Ari (NVO/Helsinki)  
Subject: Re: Second Draft of Nokia NC28574,-5,-6/004770.00033

Ari, attached is a second draft of the above-identified patent application, along with declaration and assignment. Although this is in nearly final form, Joe Stecawycz has embedded a couple of comments to the inventors in this draft that require response before we can file the application. We look forward to receiving responses to these comments before filing.

Best regards, Brad

IMAN\_BST\_78194\_1\_commented.DOC

CC: Pease, Pamela Beth

**From:** Bradley Wright  
**To:** Stacewycz, Joseph  
**Date:** 2/19/02 8:28AM  
**Subject:** for the file and Nokia status chart

**From:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**To:** Aarnio Ari (NVO/Helsinki)  
**Cc:**

**Subject:** Final Draft of NC28574/75/76 (our 4770.00033)  
**Sent:** 2/19/02 3:21 PM  
**Importance:** Normal

Ari, attached is a final draft of the above-identified patent application, including formal documents, from Joe Stacewycz. Joe has incorporated the additional comments received from the inventors. If everything is in order, please have the inventors sign these papers and return to us for filing.

Best regards, Bred

78194\_2.doc Figs\_1\_11\_0033.PDF IMAN\_BST\_78181\_1.DOC IMAN\_BST\_78195\_1.DOC

**CC:** Pease, Pamela Beth

**From:** Bradley Wright  
**To:** Stecowycz, Joseph  
**Date:** 2/26/02 1:54PM  
**Subject:** another revision

Joe, please revise as soon as possible and return with formal documents.

Thanks, Brad

**From:** Aamio Ari (NVO/Helsinki)  
**To:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**Cc:**

**Subject:** FW: Final Draft of NC28574/75/76 (our 4770.00033)  
**Sent:** 2/26/02 4:48 PM  
**Importance:** Normal

Brad,

Please find enclosed the enclosure with amendments.

BR Ari

—Original Message—

**From:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**Sent:** 19 February, 2002 15:21  
**To:** Aamio Ari (NVO/Helsinki)  
**Subject:** Final Draft of NC28574/75/76 (our 4770.00033)

78184\_2.doc

**CC:** bherd



**From:** Bradley Wright  
**To:** Stacawycz, Joseph  
**Date:** 2/28/02 5:37PM  
**Subject:** for the file/status chart

**From:** Patent-Agency Banner-Witcoff (EXT-RES/Washington)  
**To:** Aarnio Ari (NVO/Helsinki)  
**Cc:**

**Subject:** Final Draft of NC 28574,-75,-78/our 4770.00033  
**Sent:** 2/27/02 12:13 AM  
**Importance:** Normal

Ari, attached from Joe Stacawycz is a final draft of this application, including formal documents. This includes the final revisions we received from you earlier today.

If everything is in order please have the inventors sign and we will prepare for filing.

Best regards, Brad

Figs\_1\_11\_0033.PDF IMAN\_BST\_78181\_1.DOC IMAN\_BST\_78194\_3.DOC IMAN\_BST\_78195\_1.DOC

**CC:** Hard, Brenda